

ELECTROPHORECTIC STUDIES ON THE SERUM PROTEINS OF HEALTHY ADULT BRAZILIANS OF DIFFERENT RACIAL GROUPS

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SUMMARY

The authors compared the total serum protein and the albumin, as well as the globulin fractions obtained by paper electrophoresis of ten Whites, ten Negroes and ten Yellows who were born and had always lived in São Paulo. All the factors which might influence the level of the serum proteins were randomized for the three racial groups. The results showed that the Negroes had a lower concentration of albumin and a higher concentration of γ -globulin when compared with Whites and Yellows, and the Yellows had a lower concentration of α_2 -globulin when compared with Negroes and Whites. The total proteins were higher in Negroes than in Yellows. The results are discussed and ascribed to an ethnic factor.

INTRODUCTION

During an investigation upon normal values of serum proteins in adults in São Paulo, our attention was drawn by a higher concentration of γ -globulin in Negro individuals. A survey of the literature showed a rather extensive number of papers on comparative studies between the serum proteins of several racial groups. However, conclusions about the nature of the observed differences have been particularly difficult because of the poor uniformity of factors which might have influenced the results obtained. Furthermore, no paper comparing at the same time more than two racial groups has been found. Because of these facts we decided to carry out the present investigation in which we compared the values of the serum proteins of three racial groups, i.e., Whites, Negroes and Yellows, trying to randomize all the factors which might have influence on the level of the serum proteins in the human being.

MATERIAL AND METHODS

Thirty adult male individuals, between 19 and 21 years of age, were studied, being ten Negroes, ten Whites and ten Yellows. All of them were in the Army since eleven months and under the same feeding conditions. Except the common infectious diseases of infancy and childhood (as parotiditis, measles, pertussis), none had had any infection or other disease. The inquiry concerning economic level and food habits before entering the Army showed that all of them had a fair income and a good feeding. We considered as Negroes the individuals who had only Negro parents; as Yellows those who had Japanese parents and as Whites only individuals who were born from European ascendants.

Every subject was born and had always lived in the State of São Paulo. Complete physical examination, thorax X-ray, urine and stool analysis, serological tests for sy-

philis were normal. Total and specific blood counts were normal and hemoglobin was above 13 g%.

Serum total proteins were determined by the method of GORNALL, BARDAWILL & DAVID⁴. Paper electrophoresis was made by the method of GRASSMANN, HANNING & KNEDEL⁵. Blood was collected under fasting conditions from 1 or 2 individuals of each racial group on the same day. The values for each electrophoretic fraction was obtained from the value of the total proteins and the differences between them were submitted to the F test of Snedecor.

RESULTS

The average results for total proteins, albumin, α_1 , α_2 , β and γ globulins, as well as the results of the F test of Snedecor are shown in the table. The total proteins were higher in Negroes than in Yellows, while their albumin was lower and their γ -globulin was higher than in Whites and Yellows. The α_2 -globulin was in lower concentration in the Yellows than in Whites and Negroes. The differences concerning the total proteins and albumin were significant at the level of 5% and the differences concerning α_2 -

globulin and γ -globulin were significant at the level of 1%. No significant differences were found for the α_1 and β globulins.

DISCUSSION

Total proteins — MILAN⁸ reported higher levels of total proteins in Negroes when compared with Whites, while EDOZIEN³ and STEPHEN¹² did not find any differences between the total proteins of both racial groups. SNELL¹¹ studied the total proteins of a group of Japanese and found that the values were higher than those accepted for normal Europeans. WADSWORTH & OLIVEIRO¹⁴ did not find any difference between the total proteins of Asiatics and the total proteins of Europeans living in Singapore. According to our results, a significant difference was recorded only between Negroes and Yellows, which might depend on the low concentration of α_2 -globulin in Yellows, and the higher concentration of γ -globulin in Negroes.

Albumin and γ -globulin — Most papers comparing the albumin and γ -globulin or albumin and globulins of White and Negroes are in total or partial agreement with ours. Thus, a lower concentration of albu-

TABLE

g% of serum proteins of 10 White, 10 Negro, and 10 Yellow healthy Brazilian individuals

	Negroes	Whites	Yellows	Diff. 5%	Diff. 1%
T.P.	7.84	7.68	7.45	0.294	0.396
Alb.	4.46	4.48	4.49	0.196	0.264
α_1	0.32	0.34	0.32	0.028	0.038
α_2	0.64	0.65	0.53	0.071	0.096
β	0.85	0.89	0.84	0.079	0.107
γ	1.78	1.32	1.27	0.165	0.222

min and a higher of γ -globulin or globulins in Negroes were observed by RAWNSLEY *et al.*⁹, HOLMES *et al.*⁶ and MILAN⁸. Only a higher concentration of γ -globulin in Negroes was recorded by EDOZIEN³, VERA & ROCHE¹³, DEEGAN *et al.*² and COMENS¹. However, JOHNSON & WONG⁷ found no difference between the albumin and γ -globulin of Whites and Negroes.

α_1 , α_2 and β -globulins — Excepting the findings of HOLMES *et al.*⁶ who observed a higher α -globulin in Negroes when compared with the accepted values for Europeans, there is agreement among the other authors in the sense that the values for these fractions are the same for Whites and Negroes. Our results show, however, that the values of α_2 -globulin are lower in the Yellows than those in Whites and Negroes and that the difference is highly significant.

The differences observed between the albumin and γ -globulin of Whites and Negroes have been variably ascribed to infections and parasitoses, nutrition deficiencies and ethnic factors. Our results point to ethnic factors as the only explanation for the differences observed in this investigation. The intimate mechanism of this is a matter for further investigations. However, the low concentration of α -globulin in the serum of Yellows might be related to the finding of SMITHIES¹⁰ and others about hereditary factors in the control of the patterns of this complex protein fraction.

RESUMO

Estudo electroforético das proteínas séricas de brasileiros adultos de diferentes grupos raciais.

Os autores determinaram os valores absolutos das proteínas totais, albumina, α_1 , α_2 , β e γ globulinas de 30 brasileiros adultos, sendo 10 negros, 10 brancos e 10 amarelos. Todos estavam no Exército há pelo menos 11 meses, tinham entre 19 e 21 anos de idade, haviam nascido e vivido sempre em São Paulo, não contavam história de qual-

quer doença progressa, com exceção das infecções comuns à infância, não apresentavam nenhuma anormalidade ao exame físico, e os resultados dos seguintes exames foram normais: Rx do tórax, urina tipo I, parasitológico de fezes, contagem global e reações sorológicas para lues. Foram considerados negros somente os descendentes de pais e avós negros; brancos, aquêles descendentes de europeus, e amarelos aquêles cujos ascendentes eram japoneses.

A comparação entre os valores obtidos para os 3 grupos raciais mostrou que os negros tinham menor concentração de albumina e maior de γ -globulina do que os brancos e amarelos, enquanto que nos amarelos a α_2 -globulina foi mais baixa do que nos brancos e prêtos. Estas diferenças foram significativas ao nível de 1%. As proteínas totais dos prêtos foram mais elevadas do que a dos amarelos, mas a diferença foi simplesmente significante (ao nível de 5%). Os resultados foram discutidos, atribuindo-se as diferenças encontradas a fatores étnicos.

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